

Applicants: Michael R. Rosen, et al
U.S. Serial No. 09/898,417
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REMARKS

Reconsideration and allowance of the present application in view of the foregoing amendments and accompanying remarks are respectfully requested. Claims 1-3, 9, 11, 15-16, and 32-42 are currently pending and under examination in the subject application. By this Amendment, applicants have amended claims 1 and 2, and have canceled claims 15, 16, and 42 without prejudice to applicants' right to pursue the subject matter of this claim in a future application. Applicants maintain that the amended claims raise no issue of new matter and are fully supported by the specification as filed. Support for amended claim 1 may be found, in the specification, as originally filed, at, *inter alia*, page 13, lines 7-14; page 13, line 19 to page 14, line 9; and page 13, lines 17-18; and Figures 14-16 regarding "beating rate". In addition, please see the exhibits attached hereto and comments below. Support for amended claim 2 may be found, in the specification, as originally filed, at, *inter alia*, page 13, lines 15-18. Accordingly, upon entry of this Amendment, claims 1-3, 9, 11, and 32-41 will be pending and under examination.

Claims Rejected Under 35 U.S.C. §112 (First Paragraph)

The Examiner rejected claims 9, 11, and 32-42 under 35 U.S.C. §112, first paragraph, as allegedly not complying with the written description requirement. The Examiner alleged that there is no written description in the specification of a method of assaying whether an agent affects the beating rate of a cardiac cell comprising contacting a cardiac cell *in vitro* with an amount of a composition comprising a nucleic acid encoding (1) an ion channel effective to cause a sustainable beating rate (2) a HCN

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channel, or (3) a MiRP1.

In response, applicants respectfully traverse the Examiner's rejection. However, without conceding the correctness of the Examiner's position, applicants have hereinabove canceled claim 42 without prejudice, and amended claim 1 to more clearly define the claimed subject matter. Applicants note that the specification as originally filed teaches a method for assaying whether an agent affects heart rate employing a nucleic acid encoding a MiRP1, a HCN channel, or both a MiRP1 and HCN channel (see page 13, line 7 to page 14, line 9). In this regard applicants note that "beating rate" is synonymous with "heart rate" (see definitions of heart rate attached hereto as **Exhibits A-C**). Moreover, with respect to a myocyte cell, "beat rate" is correct English. Furthermore, the specification refers to "rate" in the descriptions of Figures 14-16, and the Figures show that this "rate" is the beating rate. However, applicants will amend the claims to recite the term "heart rate" if this is the only outstanding rejection after entry of this Amendment. With regard to the amendments to claim 32, applicants note that the specification contemplates such an embodiment of the claimed method at page 14, lines 7-9.

Accordingly, in light of the arguments and amendments made hereinabove, applicants respectfully request that the Examiner reconsider and withdraw this rejection.

The Examiner rejected claims 1-3, 9, 11, 15, 16, and 32-42 under 35 U.S.C. §112, first paragraph, because the specification allegedly does not describe using a genus of nucleic acids encoding an ion channel effective to cause a sustainable beating rate *in vitro*, and that the claims are allegedly broader (in scope) than the teachings in the specification.

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In response, applicants respectfully traverse the Examiner's rejection. However, without conceding the correctness of the Examiner's position, applicants have hereinabove canceled claim 42 without prejudice, and amended claim 1 to more clearly define the claimed subject matter. As amended the claims recite a defined group of nucleic acids.

Accordingly, in light of the arguments and amendments made hereinabove, applicants respectfully request that the Examiner reconsider and withdraw this rejection.

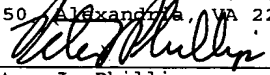
If a telephone interview would be of assistance in advancing prosecution of the subject application, applicants' undersigned attorneys invite the Examiner to telephone them at the number provided below.

No fee is deemed necessary in connection with the filing of this Amendment. However, if any fee is required, authorization is hereby given to charge the amount of any such fee to Deposit Account No. 03-3125.

Respectfully submitted,



I hereby certify that this correspondence is being deposited this date with the U.S. Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

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Medical Dictionary

The latest word on medical terms

Main Entry: **heart rate**

Function: *noun*

: a measure of cardiac activity usually expressed as number of beats per minute -- see

MAXIMUM HEART RATE

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Glossary

E

Eccentric

Eccentric refers to a muscle movement causing a lengthening of the muscle; movement of a muscle away from the body.

ECG

Electrocardiogram (ECG or EKG) is the graphic record of the heart's electrical currents obtained with the electrocardiograph, an instrument designed for recording the electrical currents that traverse the heart and initiate its contraction.

Echocardiogram

An echocardiogram is an instrument that uses ultrasound (sound waves at extremely high frequencies) to produce images of the heart and major blood vessels non-invasively (without breaking the skin).

Ecology

Ecology is the branch of biology concerned with studying the interrelationships of living organisms, specifically their relationships to each other and to the environment.

Ectopic

Ectopic means out of place and is said of an organ which is not in its proper position, or of a pregnancy occurring elsewhere than in the cavity of the uterus. In cardiology, it denotes a heart beat that has its origin in some abnormal focus other than the sinoatrial node (the area of the heart where heart beats normally originate).

Edema

An edema (or dropsy) is an excessive accumulation of fluid in the body tissues. The resultant swelling may be local, associated with an injury or inflammation, or general, as occurs in heart or kidney failure.

Effector

An effector is a cell or organ that produces a physiological response when stimulated by a nerve impulse. Examples of effectors include muscles and glands.

Efferent

Efferent means conducting (fluid or a nerve impulse) outward from a given organ or part thereof, e.g. the efferent connections of a group of nerve cells, efferent blood vessels, or the excretory duct of an organ.

Effluent

Effluent refers to something that flows out or forth.

Egocentric

Egocentric means to place extreme concentration or attention on one's self. Egocentric motor strategies are those in which the subject concentrates on a body frame of reference rather than on the external world.

Ejection time

Ejection time is the period during which, in the heart, ventricular pressures push the heart valves open and the blood in the ventricles is forced into the aorta, the main artery leading from the heart.

Electro-oculography (EOG)

Electro-oculography (EOG) is the method of placing electrodes on the skin around the eye to record eye movements. The electrodes measure the small changes in the electrical potentials in the skin as the eyeball moves.

Electrocardiogram (ECG or EKG)

An electrocardiogram (ECG or EKG) is the graphic record of the heart's electrical currents obtained with the electrocardiograph, an instrument designed for recording the electrical currents that traverse the heart and initiate its contraction.

Electrode

An electrode is a small device (a solid electric conductor) through which the microscopic electric current generated by the human body enters and can be recorded or measured.

Electroencephalogram (EEG)

An electroencephalogram is a device which records the electrical activity from different parts of the brain and converts it into a tracing called an electroencephalogram or EEG. The machine that records this activity is known as an encephalograph. The pattern of the EEG reflects the state of the patient's brain and the level of consciousness in a characteristic manner. A recording of the electrical impulses of the brain can be used to diagnose certain diseases (such as epilepsy), furnish information regarding sleep and wakefulness, and confirm brain death.

Electrolyte

An electrolyte is a solution, such as sodium chloride, that produces ions (an ion is an atom or group of atoms that conduct electricity). Electrolytes are necessary at appropriate levels for normal bodily functioning. When electrolyte levels become diminished they can be corrected by administering the appropriate substance by mouth or by intravenous drip.

Electromyogram

An electromyogram (EMG) is an instrument that records electrical currents generated in an active muscle.

Electromyographic

Electromyographic refers to an electromyogram (EMG), which is an instrument that records electrical currents generated in an active muscle.

Electromyography

Electromyography is the recording of electrical currents generated in an active muscle using an instrument called an electromyogram (EMG). EMG recordings can be used to ascertain causes of muscular weakness, paralysis, involuntary twitching, and abnormal levels of muscle enzymes;

EMGs can also be used as part of biofeedback studies.

Electron microscopy

Electron microscopy is inspection with an electron microscope. An electron microscope utilizes streams of electrons deflected from their course by an electrostatic or electromagnetic field for magnification of objects. The final image is viewed on a fluorescent screen or recorded on a photographic plate. Because of greater resolving power, images may be magnified up to 40,000 diameters, more than any other type of microscope.

Electrooculograph

An electrooculograph is an instrument which records eye movements by measuring small electrical charges with tiny electrodes attached to the skin at the inner and outer corners of the eye.

Electrophoresis

Electrophoresis is the technique of separating electrically charged particles, particularly proteins, in a solution by passing an electric current through the solution. The rate of movement of the different components depends upon their charge, so that they gradually separate into bands. Electrophoresis is widely used in the analysis of body chemicals, such as the analysis of the different proteins in blood serum.

Embryo

An embryo is an animal at the early stage of development, before birth. In plant physiology, an embryo is an immature cell that has the potential to develop into a seed.

Embryo sac

An embryo sac is a large cell that develops in the ovule of flowering plants. It contains the egg cell which, when fertilized, becomes an embryo, and then, eventually, a seed.

EMG

An electromyogram (EMG) is an instrument that records electrical currents generated in an active muscle.

Emphysema

Emphysema is a pulmonary disorder involving over-distention and destruction of the air spaces in the lungs.

End diastolic cardiac volume

End diastolic cardiac volume is the volume measured in each ventricle during diastole (period of the heart's relaxation) which normally increases to about 130 ml.

End systolic cardiac volume

End systolic cardiac volume is the volume measured in the ventricles during systole (period of the heart's contraction) which normally decreases to about 60 ml.

End tidal carbon dioxide

End tidal carbon dioxide is the amount of carbon dioxide inspired or expired with each normal breath.

Endocrine

Endocrine pertains to a gland that secretes hormones directly into the blood stream.

Endocrine glands

The endocrine glands manufacture one or more hormones and secrete them directly into the bloodstream. Endocrine glands include the pituitary, thyroid, parathyroid, adrenal, ovary, testis, placenta and part of the pancreas.

Endocrine secretions

The endocrine secretions are hormones secreted directly into the bloodstream and not through a duct.

to the exterior.

Endocrine system

The endocrine system refers to all of the body's hormone-secreting glands. This system works in conjunction with the nervous system to control the production of hormones and their release into the circulatory system.

Endocrinology

Endocrinology is the study of the structure and functions of the endocrine glands and the diagnosis and treatment of disorders of the endocrine system.

Endosteal surface

The endosteal surface is the inside surface of bones which border the bone marrow cavity.

Energy metabolism

Energy metabolism refers to the transformation of chemical energy from food to mechanical energy or heat.

Enzyme

An enzyme is usually a protein that, in small amounts, speeds up the rate of a biological reaction without itself being used up in the reaction (i.e., it acts as a catalyst). For example, enzymes present in the digestive juices of the stomach break down food into simpler compounds to be absorbed into the body.

Enzyme histochemistry

Enzyme histochemistry is the study of the chemistry of enzymes.

Enzyme Linked Immunosorbent Assay

Enzyme Linked Immunosorbent Assay (ELISA) is used for diagnosis of specific infectious diseases. An enzyme is used as the indicator system; when the enzyme and the antigen-antibody complex bind, a color indicator or other easily recognizable sign occurs.

EOG

EOG, or Electro-oculography, is a test in which electrodes placed on the skin adjacent to the outside corner of the eyes measure electrical changes between the front and back of the eyeball as the eyes move.

Eosinophil

An eosinophil is a variety of white blood cell distinguished by the presence in its cytoplasm of coarse granules; its function is poorly understood, but it is known to be capable of ingesting foreign particles, is present in large numbers in lining or covering surfaces of the body, and is involved in allergic responses.

Ephemeral

Ephemeral is anything that lasts for a brief time; transitory.

Ephyrae

Ephyrae are free swimming larvae of a jellyfish that result from the strobilation (division into segments) of a larval polyp (juvenile form of a jellyfish).

Epinephrine

Epinephrine (also called adrenaline) is a hormone secreted by the adrenal medulla section of the adrenal gland and released primarily in response to hypoglycemia; it is also produced as a synthetic drug. A powerful vasopressor substance, epinephrine acts to increase blood pressure and stimulate the heart muscle, accelerating the heart rate and increasing cardiac output.

Epithelial

An epithelial tissue is a tissue that covers the external surface of the body and lines hollow

structures inside the body.

Equilibrium

Equilibrium is a state of balance, a condition in which the contending forces are equal.

Ergometer

An ergometer is rotary pedal device (i.e., static exercise bicycle) that provides a calibrated, or specific, resistance. The force required to overcome the resistance is measured as work.

Erythrocyte

An erythrocyte is more commonly known as a red blood cell, which is the most numerous type of blood cell. Erythrocytes contain the red pigment hemoglobin and are responsible for oxygen transport. In humans, the number of erythrocytes in the blood varies between 4.5 and 5.5 million per cubic millimeter. They survive for about four months and are then destroyed in the spleen and liver.

Erythrokinetics

Erythrokinetics is a quantitative, dynamic study of in vivo (occurring within the body) production and destruction of erythrocytes (red blood cells).

Erythron

Erythron is an element of the blood-forming system of the body that is involved in the production of red blood cells; it is not a single organ but is dispersed throughout the blood-forming tissue of the bone marrow.

Erythropoiesis

Erythropoiesis is the process of red blood cell production, which normally occurs in the blood-forming tissue of the bone marrow.

Erythropoietin

Erythropoietin is a hormone secreted by certain cells in the kidney in response to a reduction in the amount of oxygen reaching the tissues; it stimulates red blood cell production.

Evacuate

Evacuate means to empty or remove the contents.

Excretion

Excretion is the transport and expulsion of waste products such as urine or carbon dioxide. It also refers to the release of hormones or protein products from cells or tissues.

Exercise capacity

Exercise capacity is the maximum ability of the body to take up and use oxygen to do work. This is often reported as the maximum number of liters of oxygen that the body can use in a minute.

Exocrine

Exocrine glands discharge secretions by means of a duct, which opens onto an epithelial surface (a tissue that covers the external surface of the body and lines hollow structures inside the body).

Extensor

An extensor is a type of muscle which works to straighten a limb, the antagonist of a flexor.

Extensor digitorum longus

The extensor digitorum longus is a superficial muscle of the lower leg which allows one to extend the foot.

Extracellular fluid

Extracellular fluid is the fluid which is inside the body, but outside the cells that are within the body.

Extracellular fluid volume

Extracellular fluid volume is the volume of the fluid external to the body's cells.

Extravehicular Activity (EVA)

An Extravehicular Activity, or EVA, is any activity that occurs external to the space vehicle requiring a crew member to wear a life support suit and exit the vehicle.

F

Fast myosin

Myosin is the most abundant protein in muscle fibrils, having the important properties of elasticity and contractility. Together with another protein called actin, it comprises the principal element which allows muscles to contract. Fast myosin refers to myosin found in fast-twitch muscle fibers, which are adapted for very rapid and very powerful muscle contractions, such as for jumping or for short-distance powerful running.

Fast-twitch fiber

Fast-twitch fiber is a muscle fiber which produces force for rapid movement and exercise, such as for jumping or full-speed running for a short distance. These fibers use no oxygen for energy, thus are called anaerobic.

Fast-twitch muscle fiber

Fast muscle fibers have much larger fibers than slow muscle fibers for greater strength of contraction; they are adapted for very rapid and very powerful muscle contractions, such as for jumping or for short-distance powerful running.

Fatigability

Fatigability is a measure of the rate at which fatigue is induced.

Fatigue

Fatigue means mental or physical tiredness, usually caused by prolonged or intense activity, but also possibly caused by disease, lack of adequate nutrition or other anomalous factors.

Fatigue test

A fatigue test is a test which determines how much work/activity can be accomplished by different muscles before their efficiency is reduced.

Femur

The femur, also called the thigh bone, is the long bone between the hip and the knee.

Ferritin

Ferritin is an iron-protein complex and is one of the forms in which iron is stored in the tissues of the intestine, spleen, and liver.

Fibrinogen

Fibrinogen is a substance present in blood plasma that causes blood coagulation.

Fixative

A fixative is a chemical which renders a cell or organism suspended or preserved in a stable state, usually so that it can be studied at a later date. For instance, a fixative might be used to preserve a tiny organism on a microscope slide.

Fixed

The term "fixed" refers to a chemical treatment of tissue or cells that results in preservation.

Flash frozen

Flash frozen means the process of freezing multiple solutions with liquid nitrogen to prevent diffusion between them until they are allowed to thaw.

Flexor

A flexor is a type of muscle which works to flex a limb (or bend towards the body); and is the

opposite of an extensor, which pulls a limb away from the body.

Floral initiation

Floral initiation is the first stage of flower production.

Flow cytometry

Flow cytometry is a method used to count cells (especially blood cells), using a glass chamber of known volume.

Fluid balance

Fluid balance is the relationship between fluid intake and fluid output. A negative fluid balance means that more fluid was put out than taken in during a given time period; a positive fluid balance is the opposite.

Fluid shift

Fluid shift refers to the shift of fluids from the lower to the upper body upon exposure to or recovery from microgravity. This phenomenon also occurs to a lesser extent during bed rest or exposure to lower body negative pressure. It may also refer to fluid transfer between intracellular and extracellular compartments.

Fluorescence microscopy

Fluorescence microscopy is the use of a light microscope that uses fluorescent light to analyze specimens.

Fluorescent bone marker

A fluorescent bone marker is a chemical marker that binds to cell constituents. Its presence is noted microscopically by the emitted fluorescence when certain types of light traverse the thin section of tissue.

Force

A force is the manifestation of the action of one body upon another. Forces arise from the action of two bodies in contact with one another.

Forced expiratory flow

Forced expiratory flow is measured by a simple pulmonary test; in performing the test the person first takes as deep a breath as possible, then exhales as rapidly and as completely as possible into a machine known as a spirometer, which measures the amount of air inhaled or exhaled.

Forced expiratory volume

The forced expiratory volume is the volume of air resulting from the forced expiratory flow test in which a person first inspires maximally to the total lung capacity, then exhales as rapidly and as completely as possible.

Forced Vital Capacity

Forced Vital Capacity (FVC) is the volume of air resulting from the forced expiratory flow test in which a person first inspires maximally to the total lung capacity, then exhales as rapidly and as completely as possible.

Formaldehyde

Formaldehyde is a pungent gas; in liquid form, it is used as an antiseptic, disinfectant and fixative for tissues.

Frame of reference

A frame of reference is used by the Central Nervous System of humans and most animals to orient the body in different situations. The reference for the vestibular organ is the gravitational force, which pulls everything on Earth downwards (to the center of the Earth) with the force of 1g.

Frequency

Frequency is the number of times a phenomenon occurs within a specified interval such as the number of repetitions per unit time of a complete waveform.

Functional residual capacity

The functional residual capacity is the amount of air remaining in the lungs at the end of normal expiration (about 2300 ml).

Fungi

Fungi are any of a large group of plants which do not contain chlorophyll, including the yeasts, molds, and mushrooms.

FVC

Forced Vital Capacity (FVC) is the volume of air resulting from the forced expiratory flow test in which a person first inspires maximally to the total lung capacity, then exhales as rapidly and as completely as possible.

G

GABA

GABA (gamma-aminobutyric acid) is an acid found in the central nervous system -- predominantly in the brain -- where it acts as an inhibitor of nerve impulses.

Galley

A galley is the kitchen of a ship or aircraft.

Ganglia

Ganglia are any structures containing a collection of nerve cell bodies.

Ganglion

A ganglion is any structure containing a collection of nerve cell bodies in the central or peripheral nervous system.

Gas chromatography

Gas chromatography is the process of separation and analysis of different substances according to their different attraction to a standard absorbent substance.

Gas exchange

Gas exchange is the exchange of carbon dioxide for oxygen.

Gas exchange ratio

The gas exchange ratio (respiratory exchange ratio, R) is the ratio of carbon dioxide output to oxygen intake. The value changes under different metabolic conditions, but the average value is considered to be 0.825.

Gastric acid

Gastric acid is the liquid secreted by the gastric glands of the stomach; its main digestive constituents are hydrochloric acid, mucin, renin and pepsinogen. The acid acts to aid in digesting food and killing unwanted bacteria and organisms that have been ingested with food.

Gastrocnemius

The gastrocnemius is a muscle that forms the greater part of the calf of the leg; it flexes the knee and foot so that the toes point downward.

Gastrocnemius medialis

The gastrocnemius medialis is the section of the gastrocnemius muscle that forms the greater part of the calf of the leg.

Gastrointestinal

Gastrointestinal refers to the stomach and intestines.

Gel electrophoresis

Gel electrophoresis is the process of separating a mixture of molecules in a gel media by the application of an electric field. In general, molecules with similar electric charges and density will migrate at the same rate together in the gel.

GEMS

Gas Exchange Measurement System. A unit consisting of two Gas Analyzer Systems that measures the CO₂ and H₂O vapor going into and leaving the leaf chamber.

Gene

The gene is the functional unit of heredity which occupies a specific place on a chromosome.

Gene expression

Gene expression is a molecular analysis that helps determine the specific sequence of the DNA.

Genetic

Genetic refers to genetics, which is a branch of science concerned with heredity.

Genetic program

The genetic program, also called the genetic code, is the information carried by the genes (DNA and RNA) and determines how an organism develops, including its appearance, function, and instincts.

Geosynchronous

Geosynchronous refers to a special type of orbit around the Earth, where an object orbits the Earth in the same direction and at the same speed as the Earth's own rotation. This results in the orbiting object remaining in a fixed position above a geographic point on the surface of the Earth.

Telecommunications satellites are often put into geosynchronous orbit so that they may be accessible via radio waves from one area of Earth at all times.

Germination

Germination is the process of beginning to grow or develop.

Glia

Glia refers to glial cells or neuroglia, the special connective tissue of the central nervous system.

Glial

Glial refers to glia or neuroglia, the special connective tissue of the central nervous system.

Globus pallidus

The globus pallidus is a structure in the brain involved in the regulation of voluntary movements at a subconscious level.

Glomerular filtration rate

The glomerular filtration rate (GFR) is the amount of glomerular filtrate -- a substance which is the same as plasma except that it has no significant amount of proteins -- that is formed each minute in all nephrons of both kidneys. The GFR is normally about 125 ml/minute.

Glovebox

A glovebox is a device used to isolate an area for work with potentially hazardous substances or materials which need to be free from direct contact with the outside environment for any reason. Most gloveboxes used in flight are small, tightly enclosed boxes having a glass panel for viewing inside and special airtight gloves which a person on the outside can use to manipulate objects inside.

Glucose-6 phosphate dehydrogenase

Glucose-6 phosphate dehydrogenase is an enzyme which participates in the formation of glucose from carbon dioxide as part of the process of photosynthesis.

Glutamate

Glutamate is a derivative of glutamic acid, an amino acid occurring in proteins.

Glutaminase

Glutaminase is an enzyme found in the kidney that catalyzes the breakdown of the amino acid glutamine to ammonia and glutamic acid. This breakdown is a stage in the production of urea, a major component of urine.

Glutaraldehyde

Glutaraldehyde is a compound used as a fixative for localization of enzyme activity; tissues fixed in glutaraldehyde may be stored for weeks or months before processing.

Glycine

Glycine is an amino acid constituent of proteins in the human body.

Glycogen

Glycogen is a large, complex carbohydrate molecule produced from glucose in the liver and muscle when blood sugar levels are high. Glycogen is broken down into lactic acid when it is used as an energy source in the liver or muscles.

Glycolysis

Glycolysis is the process of transforming glucose into lactic acid in the muscles (or other tissues), for energy production when sufficient oxygen is not available in an emergency situation.

GN2 freezer

A GN2 freezer is a small storage canister which uses gaseous nitrogen to keep samples at or below freezing.

Golgi

The Golgi apparatus is a collection of vesicles and folded membranes in a cell, usually connected to the endoplasmic reticulum. It stores and later transports the proteins manufactured in the endoplasmic reticulum. Golgi cells are types of neurons (nerve cells) within the central nervous system.

Grab Air Sampler

The Grab Air Sampler is a device which used to collect air samples. The device is evacuated thus causing air to be quickly sucked into the device once the valve is opened.

Gravireceptors

Gravireceptors are highly specialized receptor organs and nerve endings in the inner ear, joints, tendons and muscles, that give the brain information about body position, equilibrium, direction of gravitational forces, and the sensation of "down" or "up."

Gravitational field

The gravitational field of the Earth is what pulls everything towards the center of our planet. Its force is defined as 1g (one "g" or one gravity). In comparison, the gravitational force present on the moon is 0.6 g's, this weaker force allowed the astronauts to do their famous moon-jumps.

Gravitoinertial environment

A gravitoinertial environment is an environment in which gravity and inertia exist.

Gravity gradient

A gravity gradient is a change in the gravitational force depending on the relative position to the Earth.

Gravity receptors

Gravity receptors, also known as gravireceptors, are highly specialized receptor organs and nerve endings in the inner ear, joints, tendons and muscles, that give the brain information about body position, equilibrium, direction of gravitational forces, and the sensation of "down" or "up."

Growth hormone

Growth hormone (somatotropin) is an anterior pituitary hormone that causes growth of almost all cells and tissues of the body.

Growth medium

A growth medium contains nutrients and is a substance on or in which microorganisms or cells can be grown.

Guanylyl cyclase

Guanylyl cyclase is a radical (an atom or group of atoms with at least one unpaired electron) of guanylic acid, a major component of ribonucleic acid (RNA).

Gut wall

Gut wall refers to the wall of the intestine. It is here that most of the absorption of food from the digestive track into the body takes place.

H**Habitability**

Habitability is a term used to describe the capacity of a specific environment to maintain a certain quality of life. This term is often applied to the living resources and conditions of space vehicles.

Hair cell

Hair cells are sensory cells that react to mechanical stimuli and transmit information to the brain; they are the basic sensory unit of the inner ear.

Hamstring

The hamstring is any of the tendons at the back of the thigh; they attach the five hamstring muscles to their insertions on the bones of the lower leg.

Hand Grip Dynamometer (HGD)

The Hand Grip Dynamometer (HGD) is a device that measures the performance of the wrist flexor muscles. The subject has to actively push against a plate, thereby bending the wrist. At the same time, sensors inside the HGD measure the force applied.

Haptic

Haptic means referring to the sense of touch.

Haptoglobin

Haptoglobin is a protein present in blood serum that combines with hemoglobin to form a complex that is rapidly removed from the circulation by the liver.

Head down tilt

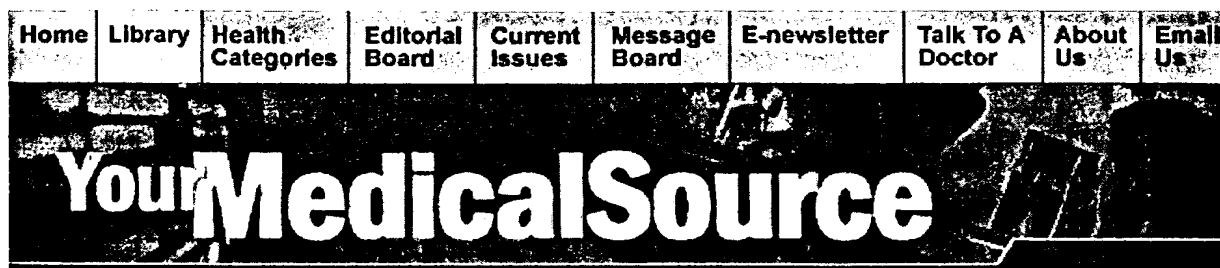
Head down tilt is a laboratory procedure wherein a subject lies flat on his back on a tilted table so that the head is below the feet; it is used to cause a headward fluid shift. Prolonged bed rest with a slight head down tilt (usually with a 5-6 degree tilt from the horizontal) can reproduce some of the effects caused by exposure to microgravity.

Head down tilt bed rest

Prolonged bed rest with a slight head down tilt (usually with a 5-6 degree tilt from the horizontal) can reproduce some of the effects caused by exposure to microgravity. Head down tilt is a laboratory procedure wherein a subject lies flat on his back on a tilted table so that the head is below the feet; it is used to cause a headward fluid shift.

Heart rate

Heart rate is the number of heart beats per unit time, usually expressed as beats per minute.



How To Reduce Your Risk For Heart Disease

Last updated December 2003

January 12, 2005

Place mouse pointer over this symbol for definition.
What Is Heart Disease?

Are You At Risk For Heart Disease?

How Can You Reduce Your Risk For Heart Disease?

What You Should Know About Cholesterol

Is Your Blood Cholesterol Level Too High?

What You Should Know About Reducing Blood Pressure

What You Should Know About Quitting The Cigarette Habit

What You Should Know About Becoming More Active

What You Should Know About Losing Weight Safely

What You Should Know About Managing Stress Effectively

Frequently Asked Questions

Putting It All Together

Glossary

Additional Sources Of Information

Other helpful websites:
Yahoo! Health

Glossary

Here are definitions of medical terms related to heart disease.

Angina pectoris: Pressure, tightness, or constricting pain in the chest that occurs due to inadequate blood flow to heart muscle; is usually associated with significant coronary artery disease.

Antioxidants: Substances in fruits, vegetables, whole grains, nuts, and seeds that can help prevent or slow build up of cholesterol and other fat-like substances in the arteries. Vitamins C and E and beta-carotene are all antioxidants that help protect against coronary heart disease.

Antihypertensive medication: A drug that is intended to reduce the blood pressure of individuals with high blood pressure (hypertension).

Atherosclerosis: A narrowing and hardening of blood vessels caused by a build-up of plaque.

Bile acids: Any of several types of acids found in bile (a yellow or greenish alkaline fluid secreted by the liver); it aids in the absorption of fats.

Blood pressure measurements: Measurements of blood pressure, usually expressed as the systolic blood pressure over the diastolic pressure.

Blood vessel: A tube conveying blood; an artery, capillary, or vein.

BMI or body mass index: A formula used to express body weight in relation to height. BMI equals weight in

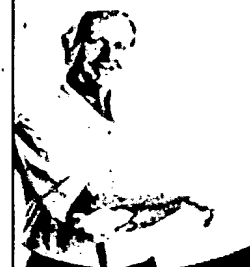
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Are you age

You may be at increased risk for heart attack, stroke, or cardiovascular death.

"Now's the time to do more."

- Jack Nicklaus, Professional Golfer



Assess Your Risk

kilograms divided by height in meters squared.

Cardiovascular risk factors: Risk factors for cardiovascular disease including hypertension (high blood pressure), cigarette smoking, diabetes, dyslipidemia (abnormal blood lipid levels), older age, gender (men, postmenopausal women), and family history of cardiovascular disease.

Cell membrane (plasma membrane): An extremely thin layer surrounding each cell in the body that only allows certain molecules to pass through it. It consists of three layers, each one molecule in thickness. The inner and outer layers are made of protein, while the middle layer is made up of a double layer of fat molecules.

Cholesterol: A fat-like substance needed for the development body cells. Cholesterol is both produced by the body and found in animal foods. Although it is a necessary substance, if levels of cholesterol are too high it can be deposited on the artery wall, narrowing or blocking blood flow and leading to coronary heart disease.

Congestive heart failure (CHF): A condition in which the heart is weakened and cannot pump efficiently.

Coronary arteries: The arteries (blood vessels) that supply oxygenated blood to the heart.

Coronary heart disease (CHD): A disease develops when one or more of the coronary arteries that supply the blood to the heart become narrower than they used to be. This happens because of a build-up of cholesterol and other substances in the wall of the blood vessel, affecting the blood flow to the heart muscle. Without an adequate blood supply, heart muscle tissue can be damaged

Diabetes: A condition in which the body can't use carbohydrates well. It is caused by a complete (type 1 diabetes) or relative (type 2 diabetes) deficiency of the hormone insulin, which acts as the "key" that allows sugar to enter cells. Without enough insulin, glucose (sugar) remains in the blood and can't enter the cells to provide energy.

Diastolic blood pressure: The lowest level of pressure in the aorta that occurs when the heart is "in between" beats. It ranges between 70-80 mm Hg in healthy adults. Blood pressure is usually read as systolic/diastolic.

Estrogen: The general term for the female sex hormone responsible for developing and maintaining female

secondary sex characteristics. Estrogen is a key component of women's monthly menstrual cycles.

Heart attack (myocardial infarction): A sudden closure or blockage of one or more blood vessels to the heart, cutting off the oxygen supply and causing damage to part of the heart. The term specifically refers to death of heart muscle cells, which is usually due to the blockage of a coronary artery.

Heart rate (HR): The number of beats (contractions) of the heart per minute

High-density lipoprotein (HDL): A lipoprotein rich in phospholipids and cholesterol that transports cholesterol to the liver to be broken down. The empty protein "envelope" is then released by the liver into the bloodstream where it can pick up cholesterol from cells and pull away cholesterol from arterial walls.

High density lipoprotein (HDL) cholesterol: A good type of cholesterol that helps the body "scrub" bad types of cholesterol out of blood vessels. High levels of HDL cholesterol are thought to protect the heart because the transported cholesterol is destined for degradation (break-down).

High blood pressure (hypertension): When the pressure, or tension, that blood exerts on walls of the blood vessels as it travels around the body is higher than normal, straining blood vessel walls.

Hormones: Chemical substances formed in one part of the body that are carried in the blood to another part of the body before they act.

Hypercholesterolemia: Abnormally high levels of cholesterol in the blood, commonly referred to as high cholesterol. It is a major risk factor for cardiovascular disease.

Lipids: Substances extracted from animal or vegetable cells; includes fatty acids, glycerides, cholesterol, and "fat-soluble" vitamins A, D, and E, among others.

Low-density lipoprotein (LDL): A "package" that transports cholesterol in the blood to the rest of the body, where it is used in making cell membranes and hormones.

Low density lipoprotein (LDL) cholesterol: A "bad" type